Claims

1. Nucleic acid composite material sensor obtainable by the steps of
   (i) providing conductive particles;
   (ii) optionally pre-treating the particles by physical or chemical means;
   (iii) mixing dry or wet nucleic acid material with conductive particles;
   (iv) depositing the composite material onto a substrate or molding the composite material to be used as a working electrode;
   (v) drying the formulation on the substrate;

2 The nucleic acid composite material sensor according to claim 1, wherein the conductive particles are made of carbon, gold, or platinum, silver and/or colloids of the same materials.

3. The nucleic acid composite material sensor according to claim 1, wherein the nucleic acid consist of double strand or single strand DNA or RNA of any lengths, ranging from a few nucleotides (oligomers) to several thousands of bases, including bulk DNA such as salmon testes DNA or calf Thymus DNA or any genomic DNA and specific nucleic acids, such as synthetic nucleic acid of specific sequences, including poly(G), poly(A), poly(T), poly(U) and poly(C) and/or the mixture of the above.

4. The nucleic acid composite material sensor according to claim 1, wherein the pre-treatment step (ii) comprises physical or chemical pretreatment of the particles with laser or plasma irradiation, mechanical grinding laminating, heat or oxidizing, acidifying and bonding agents such as ferrocene carboxylic acid.

5. The nucleic acid composite material sensor according to claim 1, wherein the pre-treatment step (ii) comprises pretreatment of the nucleic acids with DNA dyes, and intercalants, such as metal complexes including Ruthenium, ferro- and cobalt ions.

6. The nucleic acid composite material sensor according to any of claims 1 to 3, wherein the pretreatment step of composite material comprises either one of more or a combination of the treatments described in claims 4 and 5.

7. The nucleic acid composite material sensor according to any of the preceding claims, wherein the substrate consists of isolating material, such as paper, polymers.

8. The nucleic acid composite material sensor according to any of the preceding claims, wherein the substrate consists of conductive material, such as carbon ink, metallic base.

9. The nucleic acid composite material sensor according to any of the preceding claims, wherein the composite material is printed, layered, embedded, engraved onto the above substrates.

10. The nucleic acid composite material sensor according to any of the preceding claims, wherein the composite material is molded or injected with or without substrate onto a specific shape.

11. The nucleic acid composite material sensor according to any of the preceding claims, wherein the composite material is deposited onto the carrier or molded or injected at a temperature ranging from -230°C to 400°C.

12. The nucleic acid composite material sensor according to any of the preceding claims, wherein the printed or molded or injected material is heat-treated at a temperature ranging from -230°C to 400°C.

13. Use of a nucleic acid composite material sensor according to any of the preceding claims for the determination of the property of a substance or medium able to modify the structure and/or the properties of nucleic acids.

14. The use according to claim 13, wherein the modifying activity is an oxidant or

antioxidant activity.

15. Use of a composite material according to any of the claims 1 to 12 as a working electrode.

16. A method for detecting compounds or compositions having an oxidative or anti-oxidative activity, said method comprising:
providing a fluid comprising at least one compound or composition to be tested;
contacting said fluid with a nucleic acid composite material sensor according to any of the claims 1 to 12;
subjecting the sensor to conditions oxidative for nucleic acid molecules; and
determining the effect of the compound on the sensor by measuring as compared to a reference, that had been subjected to the same conditions but had not been contacted with the substance.